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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/632,812	08/04/2000	Steven H. Coberly	9323.00001	2522

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EXAMINER	
BARRY, CHESTER T	

ART UNIT	PAPER NUMBER
1724	14

DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/632,812	Applicant(s) COBERLY ET AL.	
	Examiner Chester T. Barry	Art Unit 1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
4)☐ Interview Summary (PTO-413) Paper No(s). _____
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: .

Claims 9 – 12 are rejected under §112, first paragraph, for failure of the application as originally filed to describe the claims invention, and under §251 for addition of new matter to the application.

Each of claims 9 – 12 requires that "substantially all heat stable anions transferred to the resin in step (a)" are removed by the alkali metal hydroxide added in step (b) to regenerate the resin. There is no evidence that applicants were in possession of exchanging hydroxide anions for only those anions that were transferred to the resin in the preceding step. While there is support for the concept of regenerating the capacity of the resin to substantially the same capacity as that of the previous cycle, there is no showing that applicant ever identified that the sites regenerated by hydroxide were the same sites to which anions were transferred during the previous exhaustion cycle.

USP 6245128 to George (ostensibly assigned to Mobil Oil Corporation) is cited of interest for what it claims rather than for what it teaches. Note in particular it recital in the claims of sodium chloride solution as a regenerant. Note also USP 4267159 to Crits for the teaching that a strong alkali regenerant for a Type II resin can be the salt of a strong base, such as sodium chloride, or the strong base itself, e.g., sodium hydroxide. Crits col 3 lines 30-38.

Crits is also cited of interest for the distinction it makes between Type I and Type II resins. According to Crits, a Type I resin has trimethylamine functional groups whereas a Type II resin relies on dimethyl ethanolamine for functionality.

Crits (example 2) is also cited of interest for a cyclic process in which in the ninth run, a Type II resin is exhausted and then partially regenerated to a capacity of 0.7 kilograin per cubic foot using ***calcium*** hydroxide solution (not an alkali metal hydroxide). Thereafter, the salt of a strong base, i.e., an 15% sodium chloride solution, is used to regenerate the capacity of the Type II resin to within about 15% of its original virgin capacity ((2.1-1.8)/1.8x100%). Crits' does not describe regenerating in a subsequent step the very same sites to which anion were transferred in the next preceding step. Critis' regeneration to within 15% of the original capacity using the salt of a strong base did not restore the capacity of the resin to "substantially [the same]"[1] capacity as that resulting from the previous regeneration cycle. It is also noted that in the 9 runs of exhaustion and regeneration using weak base, ie., calcium hydroxide, the capacity decreased from 2.1 to 0.7 kilograins per cu. ft. If the extent of each regeneration were consistent one run to the next, the extent of regeneration per pass or cycle would have been about 88.5%, or approximately to within only about 11.5% of the capacity of the preceding cycle. If, on the other hand, strong base were used, e.g., 0.1 – 0.3 M NaOH solution, one of skill would have expected each pass to exceed about 98.3% of the previous capacity, or to within about 1.7% of the previous cycle's capacity, or to

substantially the same capacity as in the next previous cycle ($2.1*(1-0.017)^9 = 1.8$). Accordingly, one of skill would have expected a single regeneration cycle using strong base, such as 15% sodium hydroxide, to regenerate a Type II resin exhausted with heat stable salts to substantially the same capacity as that which resulted from the previous regeneration cycle.

Claims 1 - 12 are rejected under §112, 2nd paragraph, for failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. Each of claims 1 – 12 recites a "Type II strong base anion exchange resin," but the specification does not describe what a Type II resin is. Claims are interpreted as the person of ordinary skill would have understood than at the time the invention was made. Without an adequate description of what applicants regard as a Type II resin, the skilled art artisan must rely on the teachings of the prior art to come to grips with what patentees must have had in mind when they adopted the "Type II" terminology to define their invention. Importantly, applicants on several occasions have distinguished their inventions from similar processes using Type I resins.

In light of the prior art, the skilled artisan is not put on fair notice of reasonably precise limits of the claim invention: Crits suggests that the feature distinguishing Type II from Type II resins is reliance on dimethyl ethanolamine and trimethyamine groups for anion exchange functionality, respectively. See also USP 5846883 Boone in this regard, too. USP 5692461 to Crovato, on the other hand, suggests that the difference

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[1] In applicant's specification, the largest disparity between the capacity of one run and the subsequent run was 51%

between a "Type 1" and a "Type 2" strong base anion exchange resin is the identity of the anion attached to the regenerated resin: Type 1 resins include chloride anions on trimethylamine functional groups whereas Type 2 resins include hydroxide anions on trimethylamine functional groups. See Crovato at col 25 lines 38-61. Perry's Chemical Engineering Handbook defines it not in terms of chemical constituents or in terms of the identity of the form of the resin (chloride form or hydroxide form), but rather in terms of the shape of the two component exchange isotherms. See Perry Fig. 16 – 8. In light of these various very different notions of what a "Type II" anion exchange resin is, the skilled artisan is hard-pressed to discern what applicants' invention is given his failure to define what he meant by it as his own lexicographer.

Perry is also cited for the recognition in this art of the concept of cyclic steady state. See page 16-38. USP 5254368 to Kadlec is cited for it discussion of reaching a cyclic steady state (col 6 line 45-52). USP 4344851 to Sherman is cited for the discussion of cyclic steady state in the context of an ion exchange process. USP 4768345 to Kardas and USP 4363327 to Clark are also cited of interest with regard to the understandings in various allied fields of the concept of cyclic steady state.

Respectfully,

Chester T Barry
703-306-5921

12/6/03

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to 47%. Accordingly, a regeneration step must recoup to within about 8% of the capacity of the previous regeneration cycle to qualify as "substantially [the same]."